REMARKS

Claims 1-7, as amended, remain herein.

Minor, editorial changes have been made in claims 1-7.

1. Applicants acknowledge the need to file a certified copy of the French priority document. That document is being obtained and will be filed when received by applicants' attorneys.

2. The specification was objected to under Rule 75(d)(1), and claim 5 was rejected under 35 U.S.C. §112, second paragraph. See the attached dictionary definition proving that zirconium dioxide and zirconia are the same thing. Claim 5 has been amended to moot the §112 rejection. Reconsideration and withdrawal of the objection and rejection are respectfully requested.

3. Claims 1-3 and 6 were rejected under 35 U.S.C. §103(a) over Jenkins U.S. Patent 5,855,524 in view of Chang U.S. Patent 6,402,636, or Chang in view of Jenkins; claims 4 and 5 were

rejected under 35 U.S.C. §103(a) over Jenkins in view of Chang, or vice versa, in view of Inamori U.S. Patent 3,975,023; and claim 7 was rejected under 35 U.S.C. §103(a) over Jenkins in view of Chang, or vice versa, in view of Nagai et al. U.S. Patent 5,190,289.

The presently claimed clubhead has a loft angle greater than 45 degrees, a plurality of surface grooves, a surface roughness of less than 0.25 micrometers and a Vickers hardness greater than 5 GigaPascal. This arrangement is nowhere disclosed or suggested in either of the cited references.

The Office Action admits that Jenkins '524 does not disclose a striking face roughness of less than 0.25 micrometers and cites Chang '636 as allegedly teaching same. The Office Action further admits that Chang '636 teaches a surface roughness of less than about 0.635 micrometers and a Vickers hardness coefficient of at least 14 Gpa, with the result of reduced backspin. The Office Action argues that a person skilled in the art would have found it obvious to modify the clubhead of Jenkins '524 to have a surface roughness taught by Chang '636 "to reduce the spin imparted to a golf ball struck by

the clubhead" (emphasis added here). But, while Chang '636 teaches a surface roughness of "less than about" 0.635 micrometers, Chang '636 does not disclose how much less than that figure, except to say that reduced backspin occurs.

Applicants' specification, page 3, line 35 to page 4, line 2, states that such reduction in spin does not happen at the presently claimed combination of extreme degrees of surface roughness and hardness, i.e., a wedge having a highly polished strike face with a very high degree of hardness results in a considerable increase in backspin, contrary to expectations in the prior art that the level of friction between the strike face and the ball would markedly diminish and thereby reduce the backspin. Applicants' specification, page 4, first full paragraph, describes JP 10 216 275 as a prior art reference teaching away from the presently claimed invention. JP '275 teaches measurements of reduced surface roughness and increased hardness showing a reduction of backspin, but only to the degrees of roughness and hardness stated, and no further.

Indeed, both JP '216 and Chang '636 take the reduced surface roughness and increased hardness only to certain limits,

and no further. Chang '636 simply teaches reduced backspin obtained from a surface polished to have a surface roughness "less than about" 0.635 micrometers. Chang '636 does not teach applicants' extreme reduction of surface roughness of less than 0.25 micrometers together with an extreme degree of hardness of greater than 5 Gpa. Accordingly, Chang '636 does not disclose or suggest a clubhead having a loft angle greater than 45 degrees, a plurality of surface grooves, a surface roughness of less than 0.25 micrometers and a Vickers hardness greater than 5 GigaPascal, as recited in applicants' claim 1.

Applicants' combination of a further degree of surface smoothness and further degree of hardness beyond that disclosed in the prior art does not result in reduced backspin, but instead, achieves an unexpected, opposite effect, as described in applicants' specification, page 4, second full paragraph.

Thus, the presently claimed invention achieves a result contrary to the expectations and teachings in the prior art. Contrary to the argument in the Office Action, a surface roughness of less than 0.25 micrometers and a Vickers hardness

greater than 5 GigaPascal for a clubhead having an loft angle greater than 45 degrees, results in increased backspin.

Accordingly, the reason alleged in the Office Action for modifying the clubhead of Jenkins '524 to have a surface roughness less than the roughness taught by Chang '636 "in order to reduce the spin imparted to a golf ball struck by the clubhead" is not supported by and indeed is contrary to the teachings of the prior art. Neither Chang '636 nor other prior art, such as JP '275, teaches or suggests that it would be beneficial or desirable to extend further the Chang '636 or JP '275 level of surface smoothness, together with a suitable degree of hardness, to applicants' claimed extreme levels where increased backspin is achieved. A person skilled in the art, following Chang '636 or JP '275 would reduce the surface roughness and increase the hardness only to achieve the expected reduced backspin as described in those references. Neither reference teaches or suggests anything about applicants' extreme degrees of surface smoothness or hardness, that together produce an opposite effect, i.e., increased backspin.

Therefore, contrary to the Office Action, a person skilled in the art would not have found motivation within Chang '636 or have any other reason for modifying the clubhead of Jenkins '524 to have significantly less surface roughness with significantly greater hardness beyond what is discussed in those references.

For the foregoing reasons, neither Jenkins '524 nor Chang '636 contains any teaching, suggestion, reason, motivation or incentive that would have led one of ordinary skill in the art to applicants' claimed invention or its attendant advantages. Nor is there any disclosure or teaching in either of these references that would have suggested the desirability of combining any portions thereof effectively to anticipate or suggest applicants' presently claimed invention and its attendant results. Claims 2, 3 and 6 which depend from claim 1, are allowable for the same reasons explained herein for claim 1. Accordingly, reconsideration and withdrawal of the rejections based on any combination of Jenkins and Chang are respectfully requested.

Inamori '023 and Nagai '289 were cited for alleged disclosure of ceramic material and a pattern of decreased surface roughness, respectively, but neither of Inamori '023 nor Nagai '289 provides the deficiencies of Jenkins '524 and/or Chang '636 explained above herein.

For all the foregoing reasons, none of Chang '636, Jenkins '524, Inamori '023 or Nagai '289 contains any teaching, suggestion, reason, motivation or incentive that would have led one of ordinary skill in the art to applicants' claimed invention. Nor is there any disclosure or teaching in any of these references that would have suggested the desirability of combining any portions thereof effectively to anticipate or suggest applicants' presently claimed invention or its attendant advantages. Claims 2-7, which depend from claim 1, are allowable for the same reasons explained herein for claim 1. Accordingly, reconsideration and withdrawal of all rejections are respectfully requested.

All claims 1-7 are now proper in form and patentably distinguished over all grounds of rejection stated in the Office Action. Accordingly, allowance of all claims 1-7 is respectfully requested.

Should the Examiner deem that any further action by the applicants would be desirable to place this application in even better condition for issue, the Examiner is requested to telephone applicants' undersigned representatives.

Respectfully submitted,

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August 23, 2004
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RWP:RNW/mhs

Attachment: McGraw-Hill Dictionary page 219

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On the cover: Photomicrograph of crystals of vitamin B_1.
(Dennis Kunkel, University of Hawaii)

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In addition, material has been drawn from the following references: R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *U.S. Air Force Glossary of Standardized Terms*, AF Manual 11-1, vol. 1, 1972; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; W. E. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, 1st ed., National Aeronautics and Space Administration, 1965; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology, White Sands Missile Range, New Mexico*, National Bureau of Standards, AD 467-424; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, 1st ed., Department of Defense, 197; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Glossary of Stinfo Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; *ADP Glossary*, Department of the Navy, NAVSO P-3097.

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continuous closure for adjacent pieces of textile, leather, and other materials. { 'zip·ər }

zipper conveyor [MECH ENG] A type of conveyor belt with zipperlike teeth that mesh to form a closed tube; used to handle fragile materials. { 'zip·ər kən,vā·ər }

zircaloy [MET] Any member of a group of alloys containing mainly zirconium that possess resistance to corrosion and stability over a wide range of temperatures and types of radiation. { 'zərk·ə,lói }

zircon [MINERAL] $ZrSiO_4$ A brown, green, pale-blue, red, orange, golden-yellow, grayish, or colorless neosilicate mineral occurring in tetragonal prisms; it is the chief source of zirconium; the colorless varieties provide brilliant gemstones. Also known as hyacinth; jacinth; zirconite. { 'zər,kän }

zirconia *See* zirconium oxide. { zər'kō·nē·ə }

zirconia brick [MATER] A type of brick containing zirconium oxide, used to line metallurgical furnaces. { zər'kō·nē·ə 'brik }

zirconic anhydride *See* zirconium oxide. { zər'kän·ik an'hī,drīd }

zirconite *See* zircon. { 'zərkə,nīt }

zirconium [CHEM] A metallic transition element, symbol Zr, atomic number 40, atomic weight 91.22; occurs as crystals, flammable as powder; insoluble in water, soluble in hot, concentrated acids; melts at 1850°C, boils at 4377°C. [MET] A hard, lustrous, grayish metal that is strong and ductile; used in alloys, pyrotechnics, welding fluxes, and explosives. { zər'kō·nē·əm }

zirconium-95 [NUC PHYS] A radioactive isotope of zirconium; half-life of 63 days with beta and gamma radiation; used to trace petroleum-pipeline flows and in the circulation of a catalyst in a cracking plant. { zər'kō·nē·əm ,nīn·tē'fīv }

zirconium boride [INORG CHEM] ZrB_2 A hard, toxic, gray powder that melts at 3000°C; used as an aerospace refractory, in cutting tools, and to protect thermocouple tubes. Also known as zirconium diboride. { zər'kō·nē·əm 'bór,īd }

zirconium carbide [INORG CHEM] ZrC Hard, gray crystals that are soluble in water, soluble in acids; as powder, it ignites spontaneously in air; melts at 3400°C, boils at 5100°C; used as an abrasive, refractory, and metal cladding, and in cermets, incandescent filaments, and cutting tools. { zər'kō·nē·əm 'kär,bīd }

zirconium chloride *See* zirconium tetrachloride. { zər'kō·nē·əm 'klór,īd }

zirconium diboride *See* zirconium boride. { zər'kō·nē·əm dī'bór,īd }

zirconium dioxide *See* zirconium oxide. { zər'kō·nē·əm dī'äk,sīd }

zirconium halide [INORG CHEM] A compound of zirconium with a halogen; for example, $ZrBr_2$, $ZrCl_2$, $ZrCl_3$, $ZrCl_4$, $ZrBr_2$, $ZrBr_3$, ZrF_4, and ZrI_4. { zər'kō·nē·əm 'ha,līd }

zirconium hydride [INORG CHEM] ZrH_2 A flammable, gray-black powder; used in powder metallurgy and nuclear moderators, and as a reducing agent, vacuum-tube getter, and metal-foaming agent. { zər'kō·nē·əm 'hī,drīd }

zirconium hydroxide [INORG CHEM] $Zr(OH)_4$ A toxic, amorphous white powder; insoluble in water, soluble in dilute mineral acids; decomposes at 550°C; used in pigments, glass, and dyes, and to make zirconium compounds. { zər'kō·nē·əm hī'dräk,sīd }

zirconium lamp [ELECTR] A high-intensity point-source lamp having a zirconium oxide cathode in an argon-filled bulb, used because of its low emanation of long-wavelength light and its concentrated source. { zər'kō·nē·əm 'lamp }

zirconium nitride [INORG CHEM] ZrN A hard, brassy powder that is soluble in concentrated acids; melts at 2930°C; used in refractories, cermets, and laboratory crucibles. { zər'kō·nē·əm 'nī,trīd }

zirconium orthophosphate *See* zirconium phosphate. { zər'kō·nē·əm ,ór·thō'fā,sfāt }

zirconium oxide [INORG CHEM] ZrO_2 A toxic, heavy white powder that is insoluble in water, soluble in mineral acids; melts at 2700°C; used in ceramic glazes, special glasses, and medicine, and to make piezoelectric crystals. Also known as zirconia; zirconic anhydride; zirconium dioxide. { zər'kō·nē·əm 'äk,sīd }

zirconium oxide-based oxygen transducer [ENG] A device in which the concentration of oxygen in a mixture of gases is determined from the diffusion voltage across a heated, suitably doped zirconium oxide material placed between this mixture and a reference gas. { zər,kō·nē·əm ,äk,sīd ,bāst ,äks·ə·jən tranz'düs·ər }

zirconium oxychloride [INORG CHEM] $ZrOCl_2 \cdot 8H_2O$ White crystals that are soluble in water, insoluble in organic solvents, and acidic in aqueous solution; used for textile dyeing and oil-field acidizing, in cosmetics and greases, and for antiperspirants and water repellents. Also known as zirconyl chloride. { zər'kō·nē·əm ,äk·sē'klór,īd }

zirconium phosphate [INORG CHEM] $ZrO(H_2PO_4)_2 \cdot 3H_2O$ A toxic, dense white powder that is insoluble in water, soluble in acids and organic solvents; decomposes on heating; used as an analytical reagent, coagulant, and radioactive-phosphor carrier. Also known as zirconium orthophosphate. { zər'kō·nē·əm 'fā,sfāt }

zirconium tetrachloride [INORG CHEM] $ZrCl_4$ Toxic, alcohol-soluble, white lustrous crystals; sublimes above 300°C and decomposes in water; used to make pure zirconium and for water-repellent textiles and as an analytical reagent. Also known as zirconium chloride. { zər'kō·nē·əm ,te·trə'klór,īd }

zircon sand [MATER] A refractory sand consisting principally of zirconium silicate and characterized by low thermal expansion and high thermal conductivity. { 'zər,kän 'sand }

zirconyl chloride *See* zirconium oxychloride. { 'zər·kən·əl 'klór,īd }

zirkelite [MINERAL] A black mineral consisting of an oxide of zirconium, titanium, calcium, ferrous iron, thorium, uranium, and rare earths. { 'zər·kə,līt }

zitterbewegung [QUANT MECH] An oscillatory motion of an electron suggested in some interpretations of the Dirac electron theory, having a frequency greater than $4\pi mc^2/h$, where m is the electron's mass, c is the speed of light, and h is Planck's constant, or approximately 1.5×10^{21} hertz. { 'tsid·ər be'vā,gūŋ }

Ziv-Lempel compression [COMPUT SCI] A data compression technique in which data is represented by a sequence of numbers standing for the positions of character strings in a dictionary; this dictionary initially contains every character in the alphabet and is continually enlarged by forming new strings from the string just compressed and the upcoming character in the text. { 'ziv 'lem·pəl kəm'presh·ən }

Z line [HISTOL] The line formed by attachment of the actin filaments between two sarcomeres. { 'zē ,līn }

Z-marker beacon [NAV] Transmitter equipment installed as part of a four-course radio range; it radiates vertically to indicate to aircraft when they pass directly over the range station; it is usually not keyed for identification. { 'zē 'märk·ər ,bē·kən }

Zn *See* zinc.

Zoantharia [INV ZOO] A subclass of the class Anthozoa; individuals are monomorphic and most have retractile, simple, tubular tentacles. { ,zō·ən'thar·ē·ə }

Zoanthidea [INV ZOO] An order of anthozoans in the subclass Zoantharia; these are mostly colonial, sedentary, skeletonless, anemonelike animals that live in warm, shallow waters and coral reefs. { ,zō·ən'thid·ē·ə }

Zoarcidae [VERT ZOO] The eelpouts, a family of actinopterygian fishes in the order Gadiformes which inhabit cold northern and far southern seas. { zō'ärsə,dē }

zobaa [METEOROL] In Egypt, a lofty whirlwind of sand resembling a pillar, moving with great velocity. { zō'bä }

Zodiac [ASTRON] A band of the sky extending 8° on each side of the ecliptic, within which the moon and principal planets remain. { 'zō·dē,ak }

zodiacal cone *See* zodiacal pyramid. { zō'dī·ə·kəl 'kōn }

zodiacal constellations [ASTRON] The constellations Aries, Taurus, Gemini; Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius, and Pisces which are assigned to 12 equal portions of the zodiac. { zō'dī·ə·kəl ,kän·stə'lā·shənz }

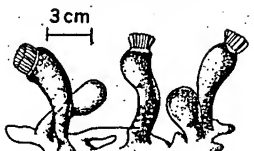
zodiacal counterglow *See* gegenschein. { zō'dī·ə·kəl 'kaunt·ər,glō }

zodiacal light [GEOPHYS] A diffuse band of luminosity occasionally visible on the ecliptic; it is sunlight diffracted and reflected by dust particles in the solar system within and beyond the orbit of the earth. { zō'dī·ə·kəl 'līt }

zodiacal pyramid [GEOPHYS] The pattern formed by the zodiacal light. Also known as zodiacal cone. { zō'dī·ə·kəl 'pir·ə·mid }

zoea [INV ZOO] An early larval stage of decapod crustaceans distinguished by a relatively large cephalothorax, conspicuous eyes, and large, fringed antennae. { zō'ē·ə }

ZOANTHIDEA



Colony of *Zoanthina tentaculat*

ZOEA

Zoea larva of crab, showing characteristic features. *(Smithsonian Institution)*